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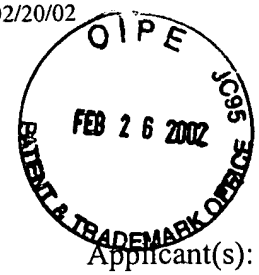
TJM/mq
02/20/02

PATENT APPLICATION
Docket No.: 3232.1000-001




IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Stephen H. Redington

Application No.: 10/025,208 Group: 2661

Filed: December 19, 2001 Examiner: Not Assigned

For: SYSTEM AND METHOD FOR DYNAMIC LOCAL LOOP BANDWIDTH MULTIPLEXING

CERTIFICATE OF MAILING

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Date Signature

MARY QUAN
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TRANSMITTAL OF FORMAL DRAWINGS

Commissioner for Patents
P.O. Box 2327
Arlington, VA 22202

Sir:

Transmitted herewith are formal drawings, sheets 1/15 - 15/15, figures 1-17, for filing in the subject patent application.

Acceptance of the formal drawings is respectfully requested.

10/025,208

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

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Concord, MA 01742-9133
Date: 2/20/02

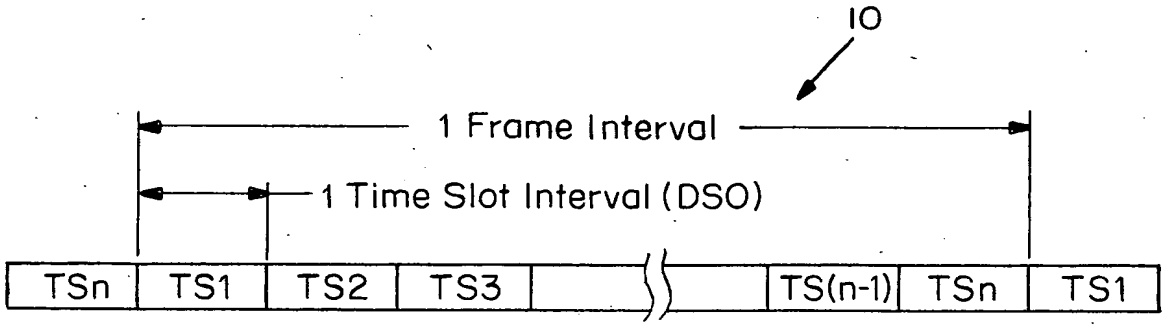



FIG. 1 (PRIOR ART)

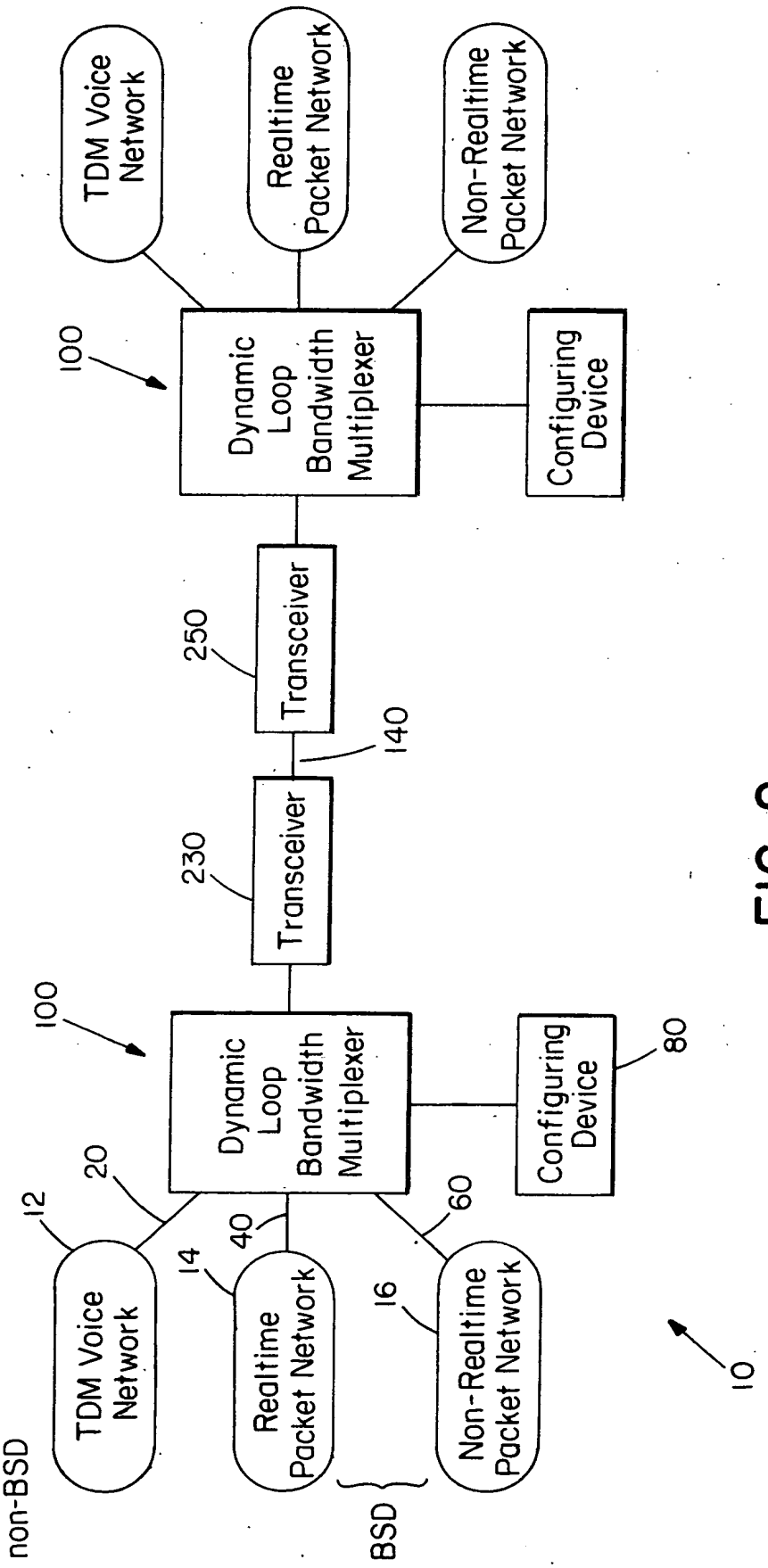

TDM Voice Network
Realtime Packet Network
Non-Realtime Packet Network
100
Dynamic Loop Bandwidth Multiplexer
Configuring Device
250
Transceiver
140
230
Transceiver
100
Dynamic Loop Bandwidth Multiplexer
Configuring Device
80
20
12
40
14
60
16
TDM Voice Network
Realtime Packet Network
Non-Realtime Packet Network
10
non-BSD
BSD

FIG. 2

FIG. 3

| FIG. 3A | FIG. 3B |
|---|---|

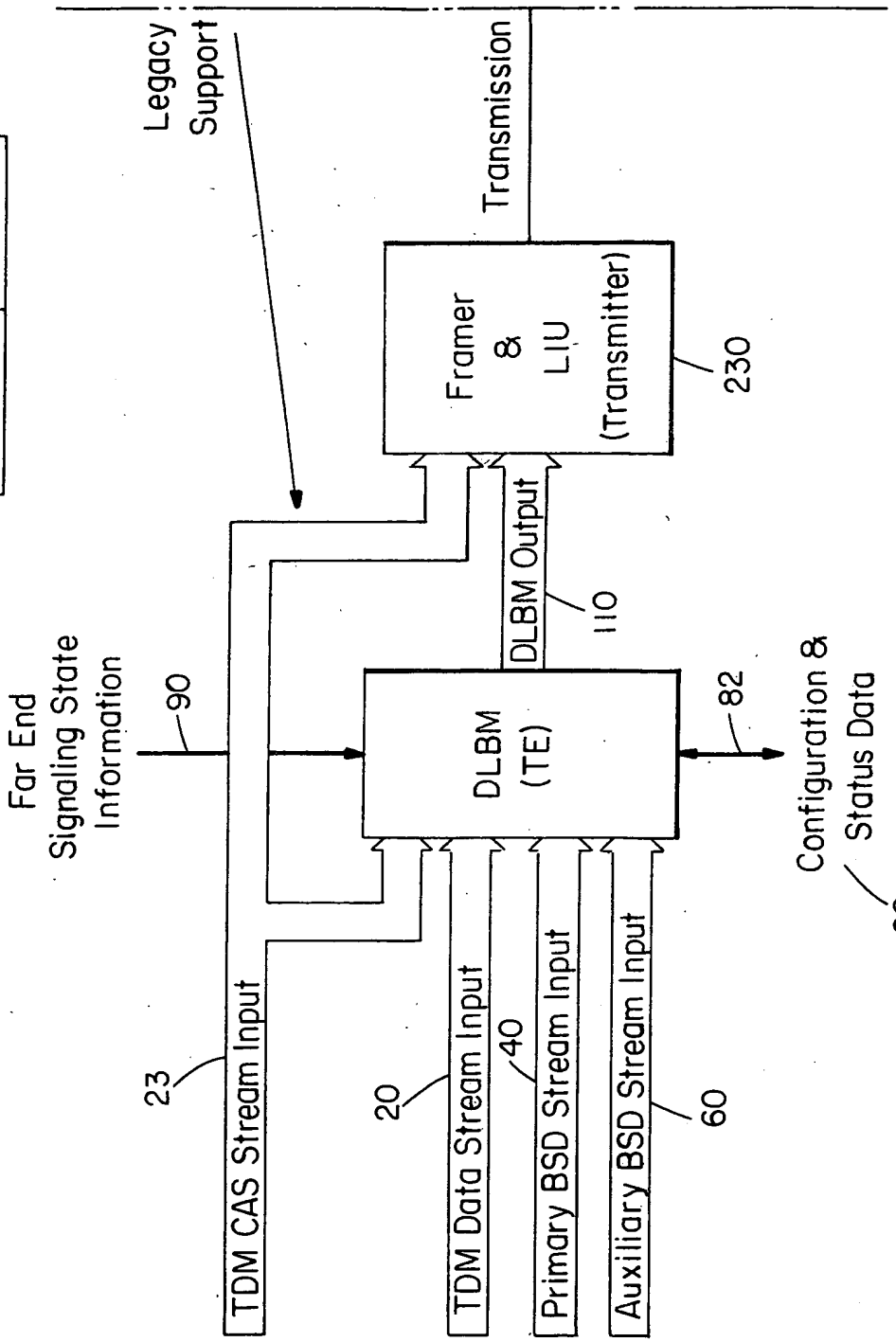



FIG. 3A

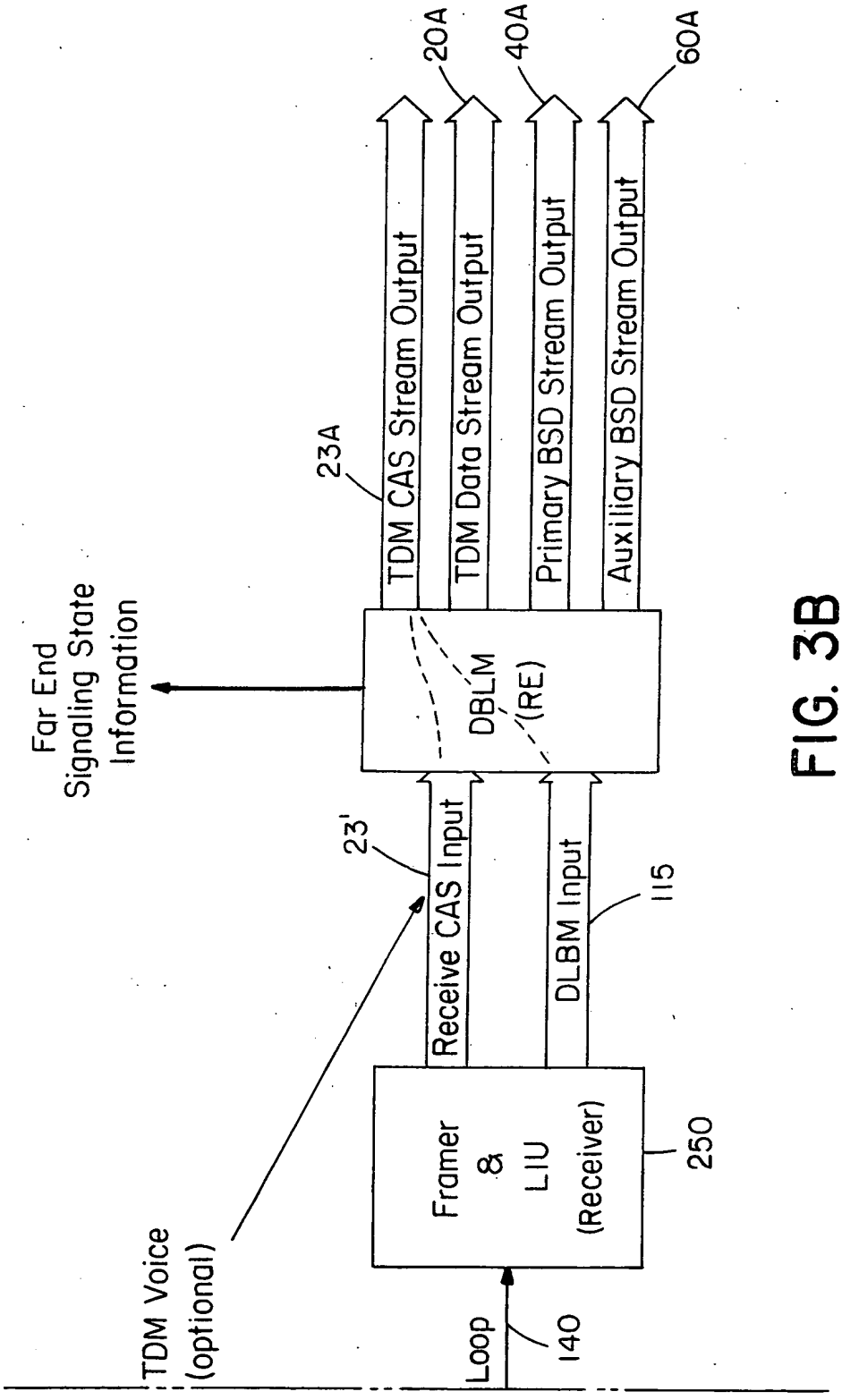

20A
40A
60A
TDM CAS Stream Output
TDM Data Stream Output
Primary BSD Stream Output
Auxiliary BSD Stream Output
23A
Far End
Signaling State
Information
DBLM
(RE)
23'
Receive CAS Input
DLBM Input
115
Framer
&
LIU
(Receiver)
250
TDM Voice
(optional)
Loop
140

FIG. 3B

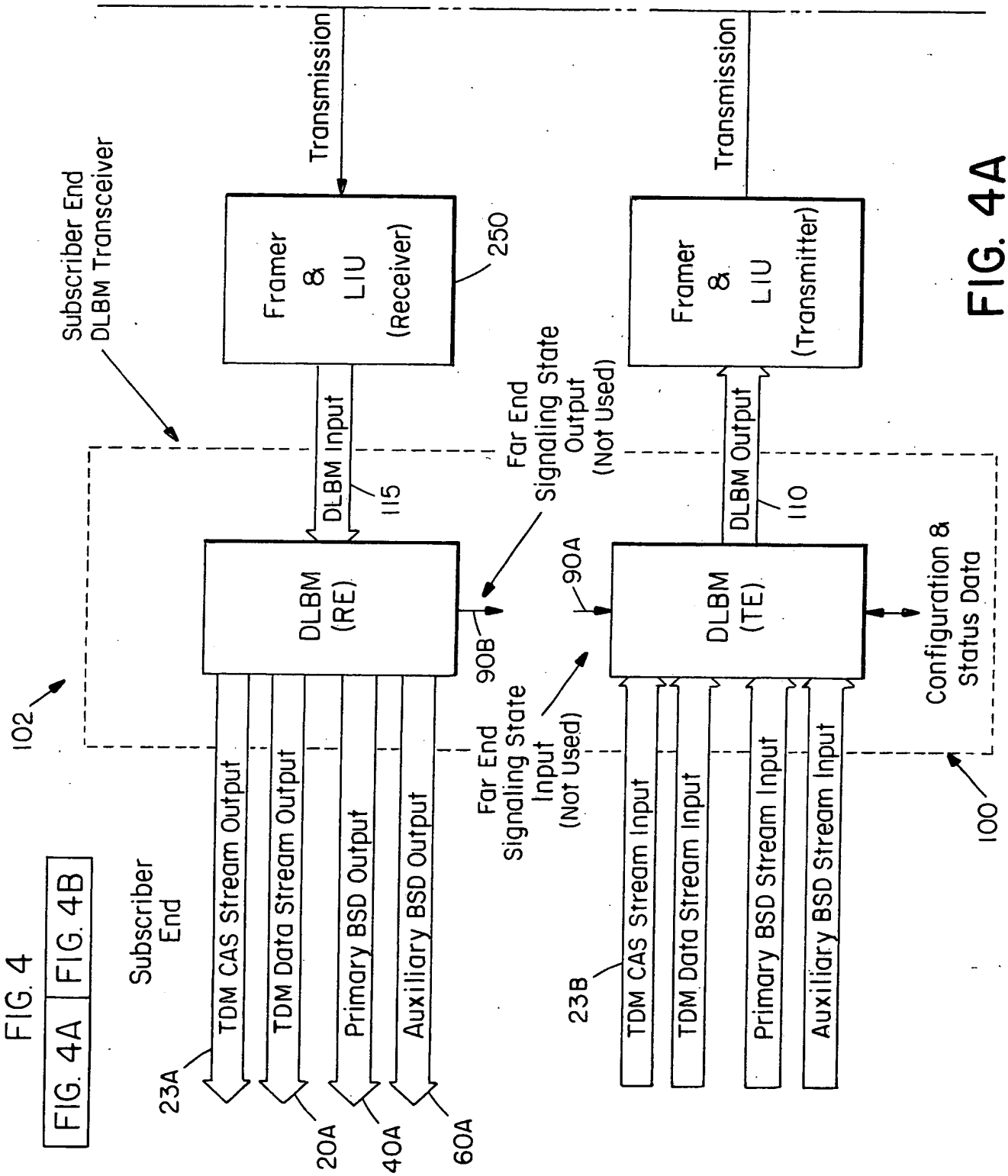



FIG. 4A

FIG. 4

| FIG. 4A | FIG. 4B |
|---|---|

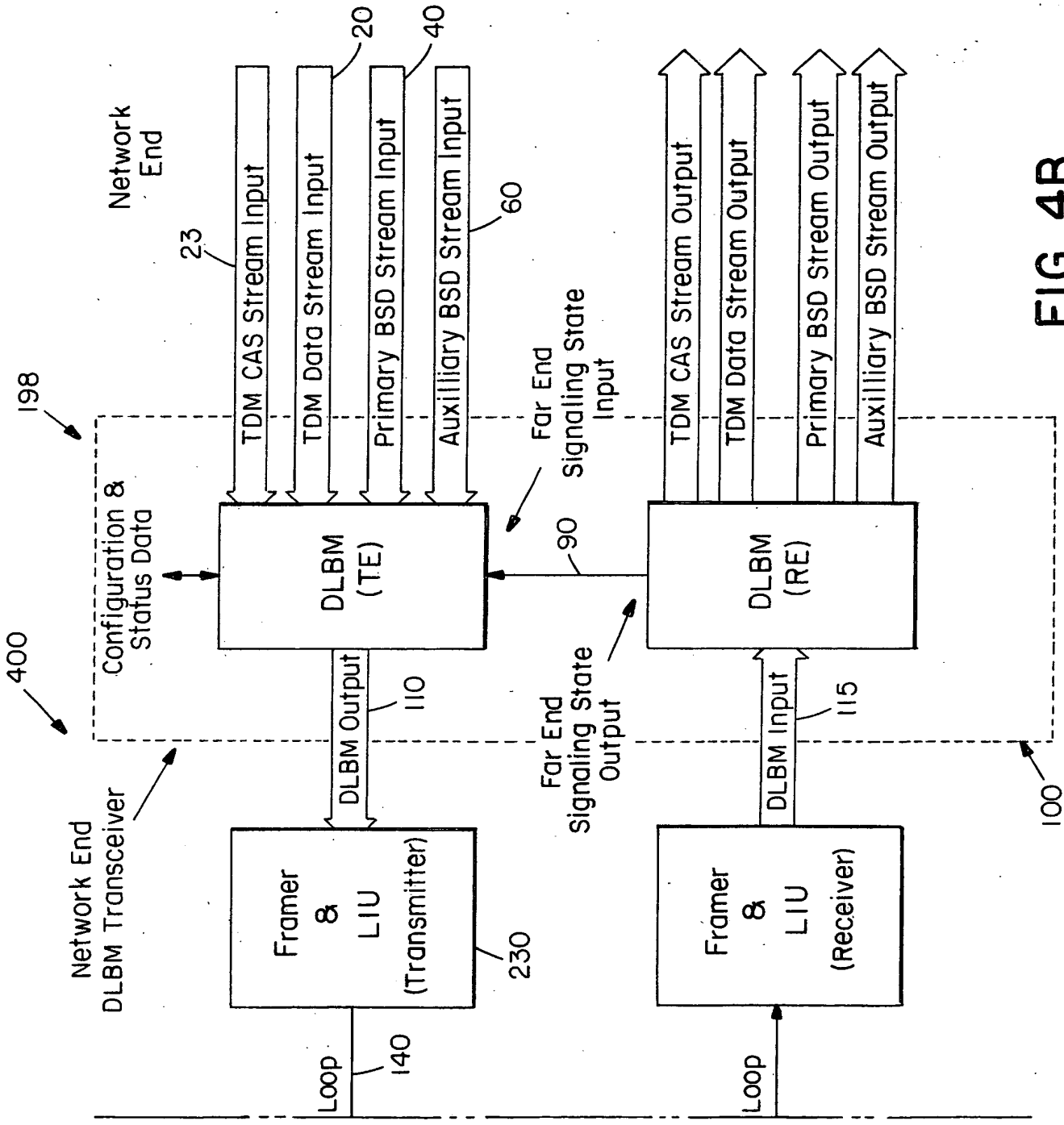

Network End
TDM CAS Stream Input
TDM Data Stream Input
Primary BSD Stream Input
Auxilliary BSD Stream Input
20
40
60
23
198
Configuration & Status Data
DLBM (TE)
Far End Signaling State Input
90
DLBM (RE)
TDM CAS Stream Output
TDM Data Stream Output
Primary BSD Stream Output
Auxilliary BSD Stream Output
400
DLBM Output
110
DLBM Input
115
Far End Signaling State Output
Network End DLBM Transceiver
Framer & LIU (Transmitter)
230
Framer & LIU (Receiver)
Loop
140
Loop
100

FIG. 4B

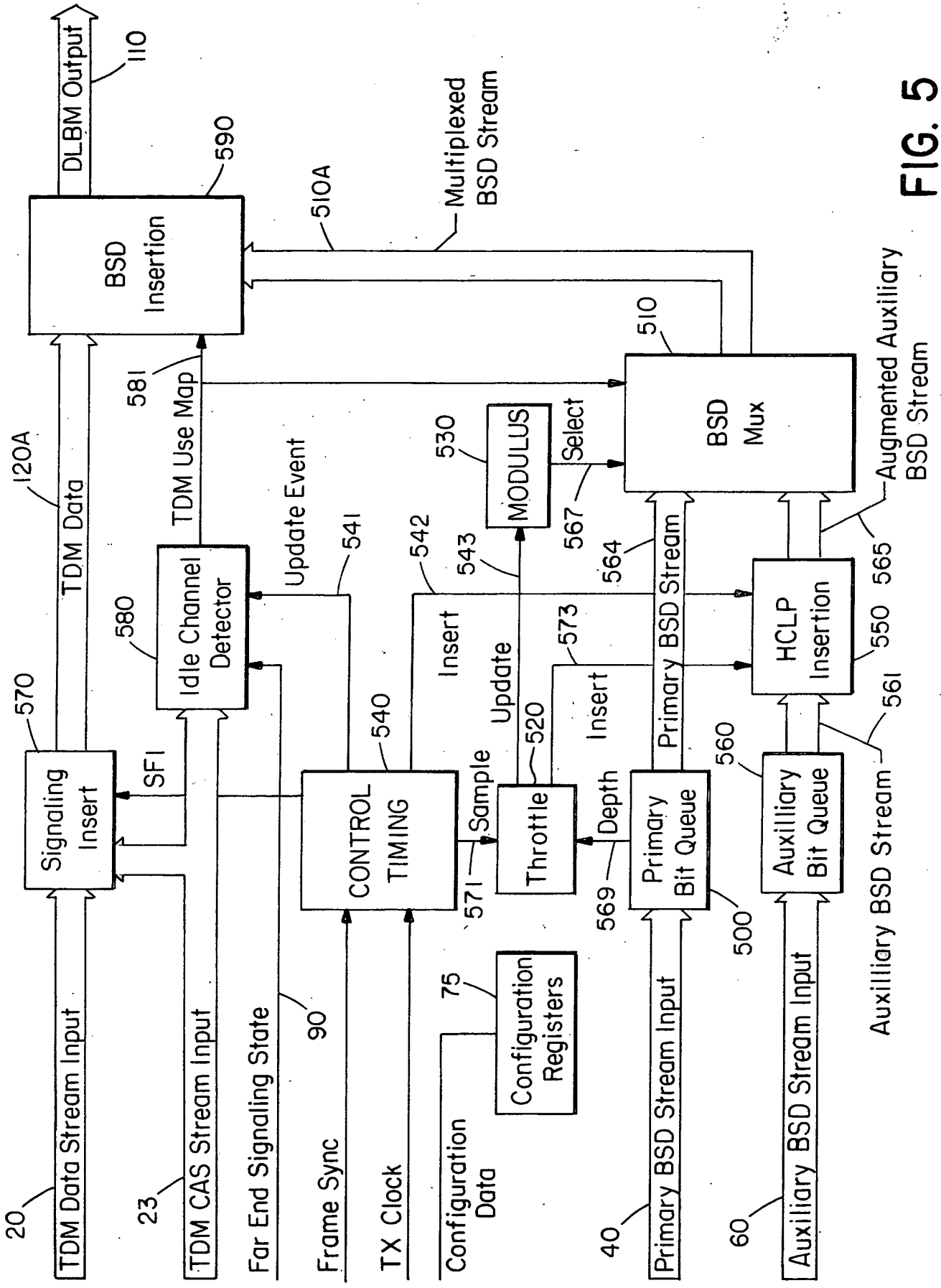

DLBM Output
110
590
BSD Insertion
510A
Multiplexed BSD Stream
510
BSD Mux
Augmented Auxiliary BSD Stream
565
581
TDM Use Map
120A
TDM Data
530
MODULUS
Select
567
564
Primary BSD Stream
580
Idle Channel Detector
Update Event
541
542
543
Insert
Update
573
Insert
HCLP Insertion
550
570
Signaling Insert
SF1
540
CONTROL TIMING
Sample
520
Throttle
Depth
569
Primary Bit Queue
500
560
Auxilliary Bit Queue
561
Auxilliary BSD Stream
571
75
Configuration Registers
Configuration Data
90
Far End Signaling State
Frame Sync
TX Clock
20
TDM Data Stream Input
23
TDM CAS Stream Input
40
Primary BSD Stream Input
60
Auxiliary BSD Stream Input

FIG. 5

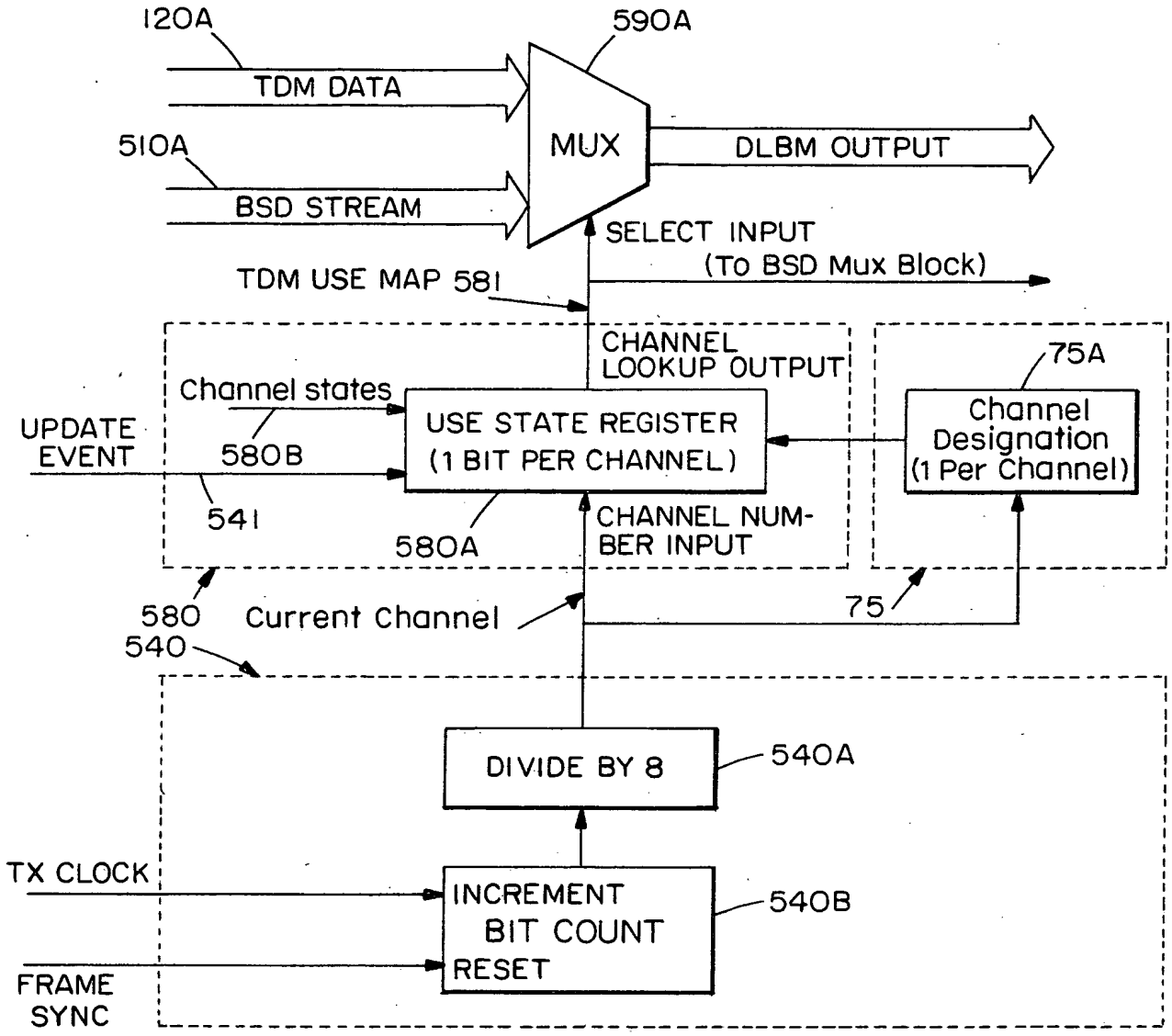
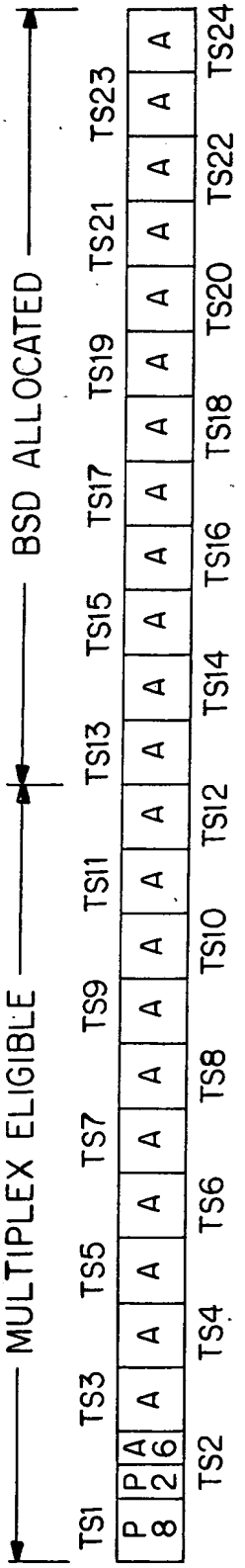
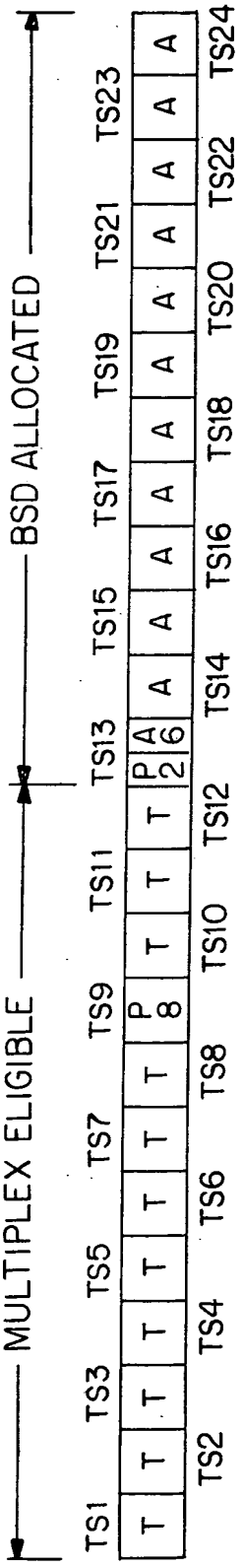

120A
590A
TDM DATA
MUX
DLBM OUTPUT
510A
BSD STREAM
SELECT INPUT
(To BSD Mux Block)
TDM USE MAP 581
CHANNEL
LOOKUP OUTPUT
75A
Channel states
USE STATE REGISTER
(1 BIT PER CHANNEL)
Channel
Designation
(1 Per Channel)
UPDATE
EVENT
580B
541
580A
CHANNEL NUM-
BER INPUT
580
Current Channel
75
540
DIVIDE BY 8
540A
TX CLOCK
INCREMENT
BIT COUNT
RESET
540B
FRAME
SYNC

FIG. 6




P = PRIMARY ; A = AUXILIARY
MODULUS = 10
TS1 to TS12 = IDLE

FIG. 7




P = PRIMARY ; A = AUXILIARY ; T = TDM
MODULUS = 10
TS1 to TS8 = ACTIVE ; TS9 = IDLE ; TS10 to TS12 = ACTIVE

FIG. 8

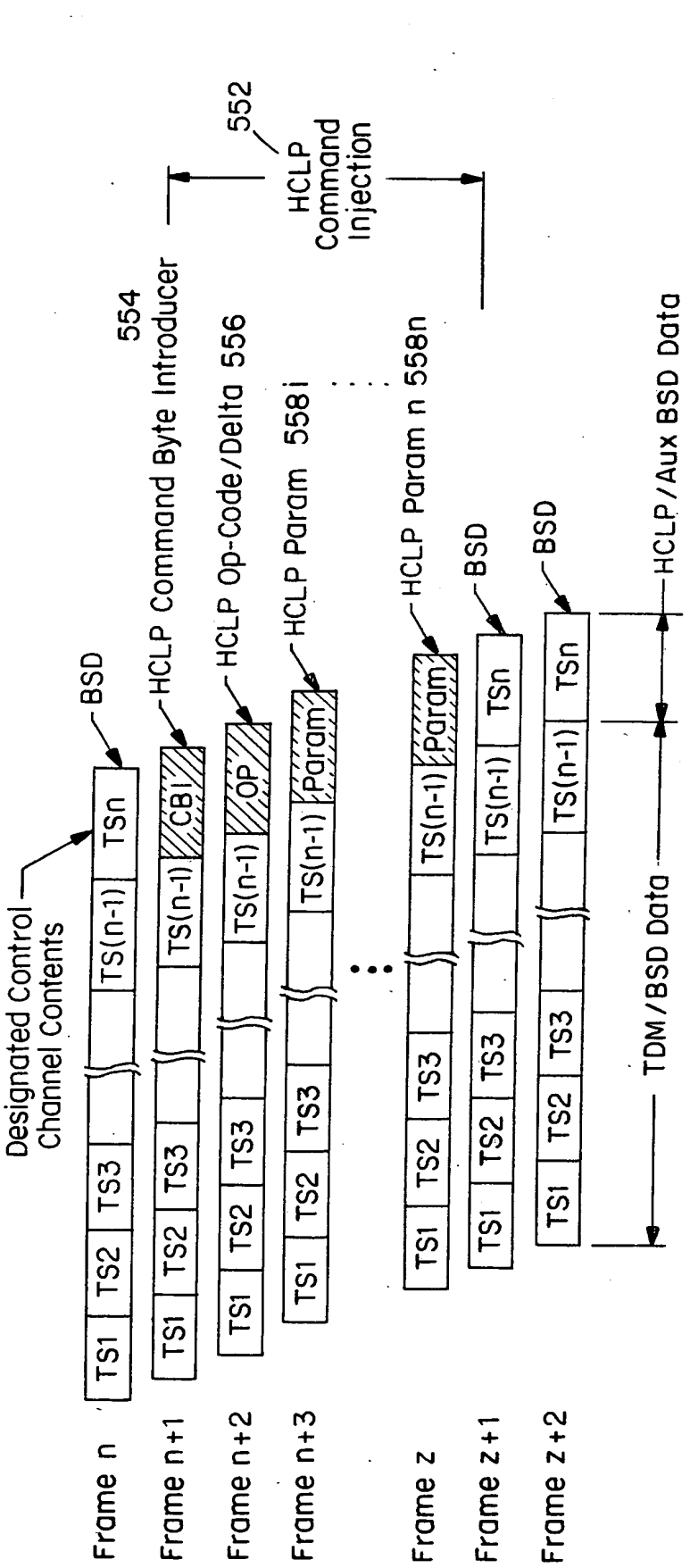

Designated Control Channel Contents
BSD
HCLP Command Byte Introducer
554
HCLP Op-Code/Delta 556
HCLP Param 558i
HCLP Param n 558n
HCLP Command Injection
552
BSD
BSD
HCLP/Aux BSD Data
TDM/BSD Data
Frame n
Frame n+1
Frame n+2
Frame n+3
Frame z
Frame z+1
Frame z+2
TS1
TS2
TS3
TS(n-1)
TSn
CB
OP
Param

FIG. 9

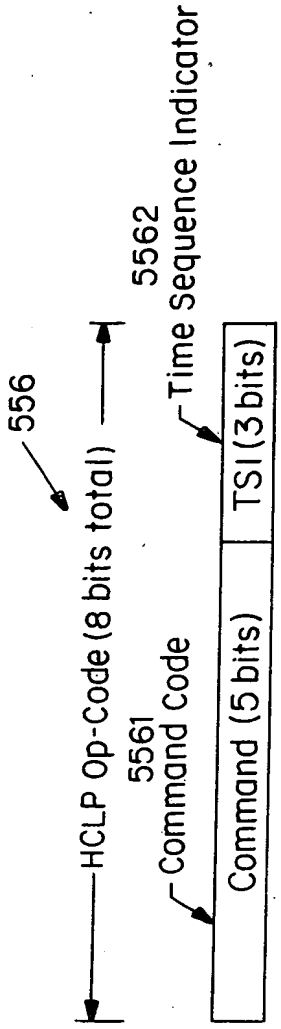

556
HCLP Op-Code (8 bits total)
5561
Command Code
Command (5 bits)
5562
Time Sequence Indicator
TSI (3 bits)

FIG. 10

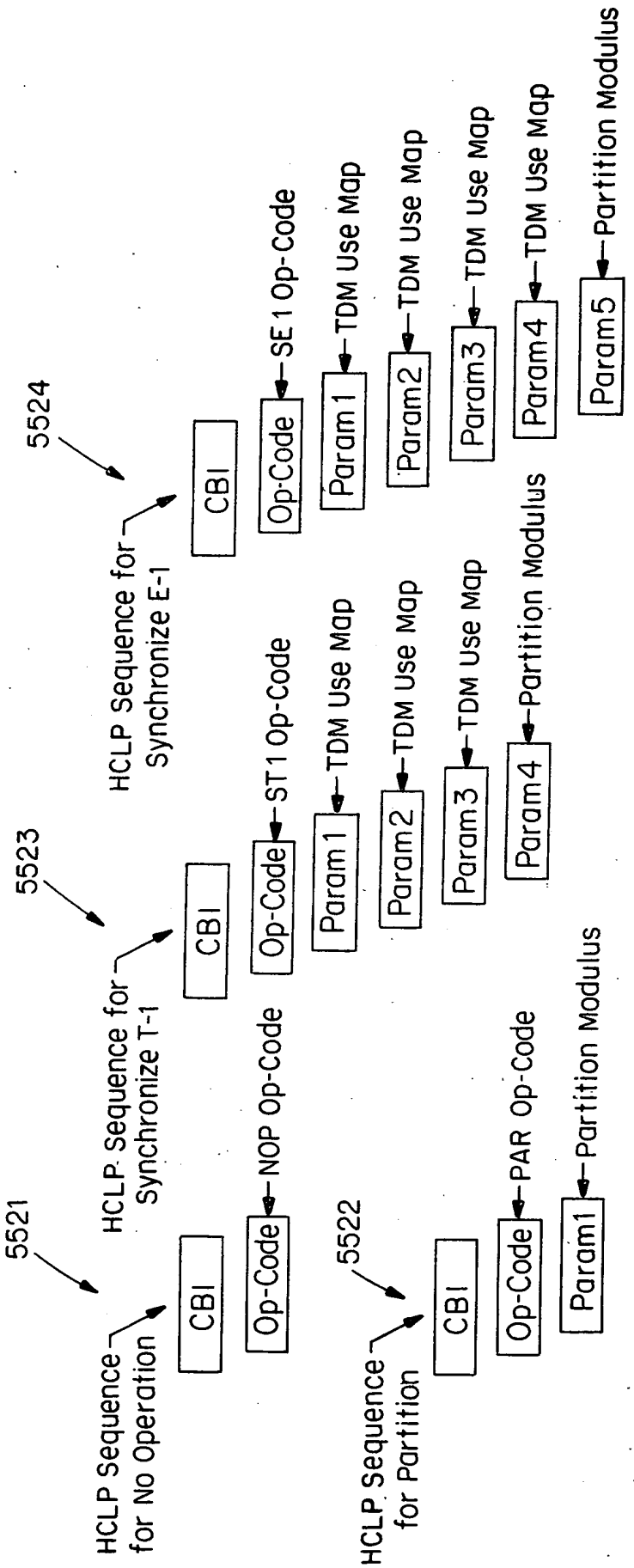

5521
HCLP Sequence for No Operation
CBI
Op-Code
NOP Op-Code
5522
HCLP Sequence for Partition
CBI
Op-Code
PAR Op-Code
Param1
Partition Modulus
5523
HCLP Sequence for Synchronize T-1
CBI
Op-Code
ST1 Op-Code
Param1
TDM Use Map
Param2
TDM Use Map
Param3
TDM Use Map
Param4
Partition Modulus
5524
HCLP Sequence for Synchronize E-1
CBI
Op-Code
SE1 Op-Code
Param1
TDM Use Map
Param2
TDM Use Map
Param3
TDM Use Map
Param4
TDM Use Map
Param5
Partition Modulus

FIG. 11

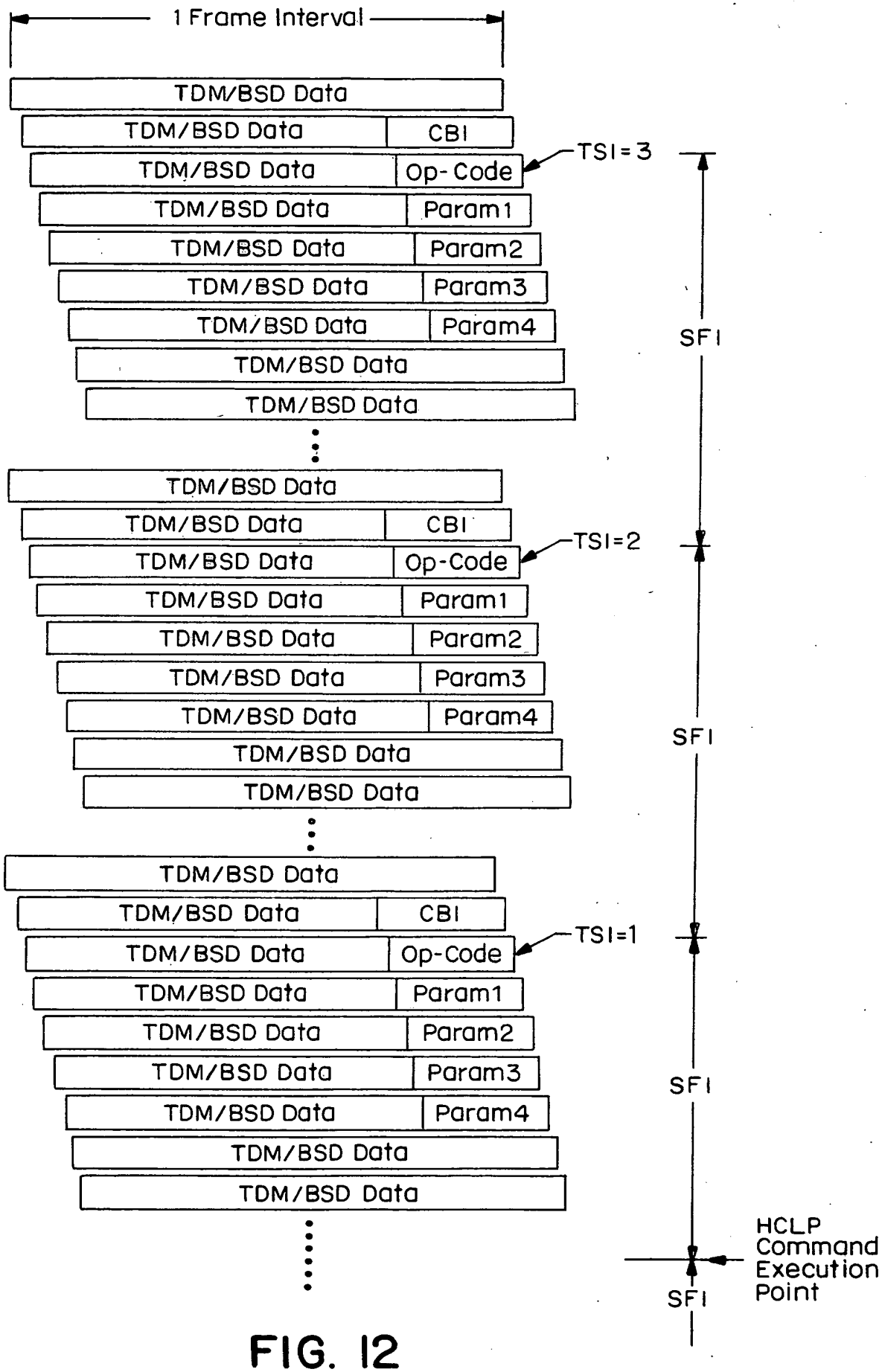

1 Frame Interval
TDM/BSD Data
TDM/BSD Data
CBI
TDM/BSD Data
Op-Code
TSI=3
TDM/BSD Data
Param1
TDM/BSD Data
Param2
TDM/BSD Data
Param3
TDM/BSD Data
Param4
TDM/BSD Data
TDM/BSD Data
TDM/BSD Data
TDM/BSD Data
CBI
TDM/BSD Data
Op-Code
TSI=2
TDM/BSD Data
Param1
TDM/BSD Data
Param2
TDM/BSD Data
Param3
TDM/BSD Data
Param4
TDM/BSD Data
TDM/BSD Data
TDM/BSD Data
TDM/BSD Data
CBI
TDM/BSD Data
Op-Code
TSI=1
TDM/BSD Data
Param1
TDM/BSD Data
Param2
TDM/BSD Data
Param3
TDM/BSD Data
Param4
TDM/BSD Data
TDM/BSD Data
SFI
SFI
SFI
SFI
HCLP
Command
Execution
Point

FIG. 12

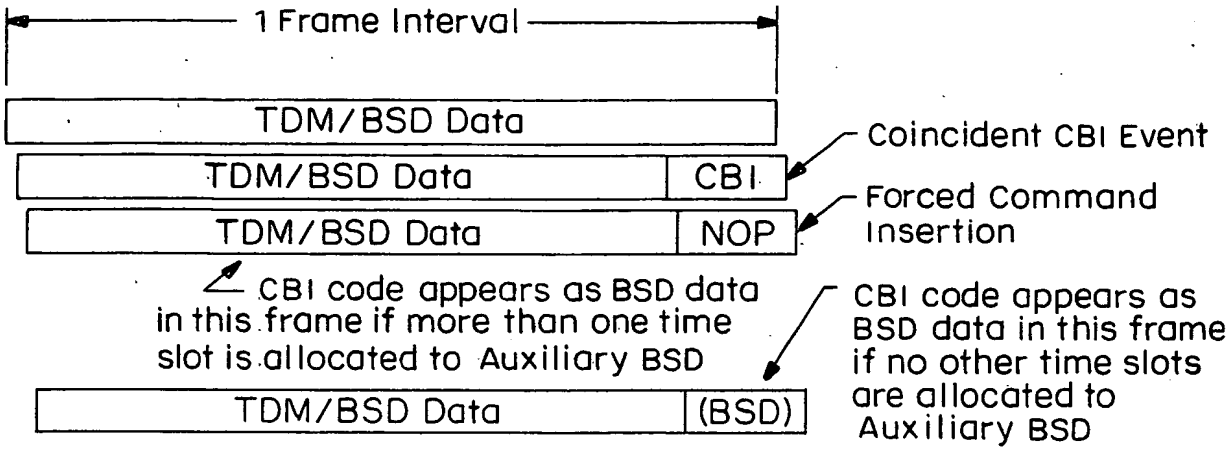



FIG. 13

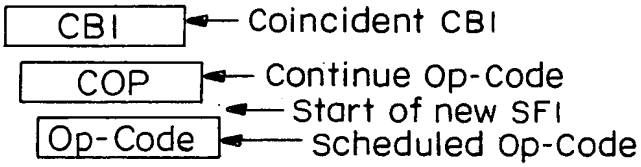



FIG. 14

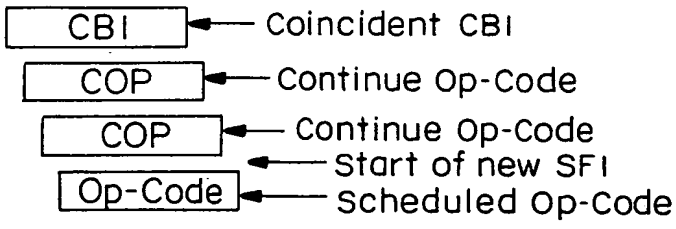



FIG. 15

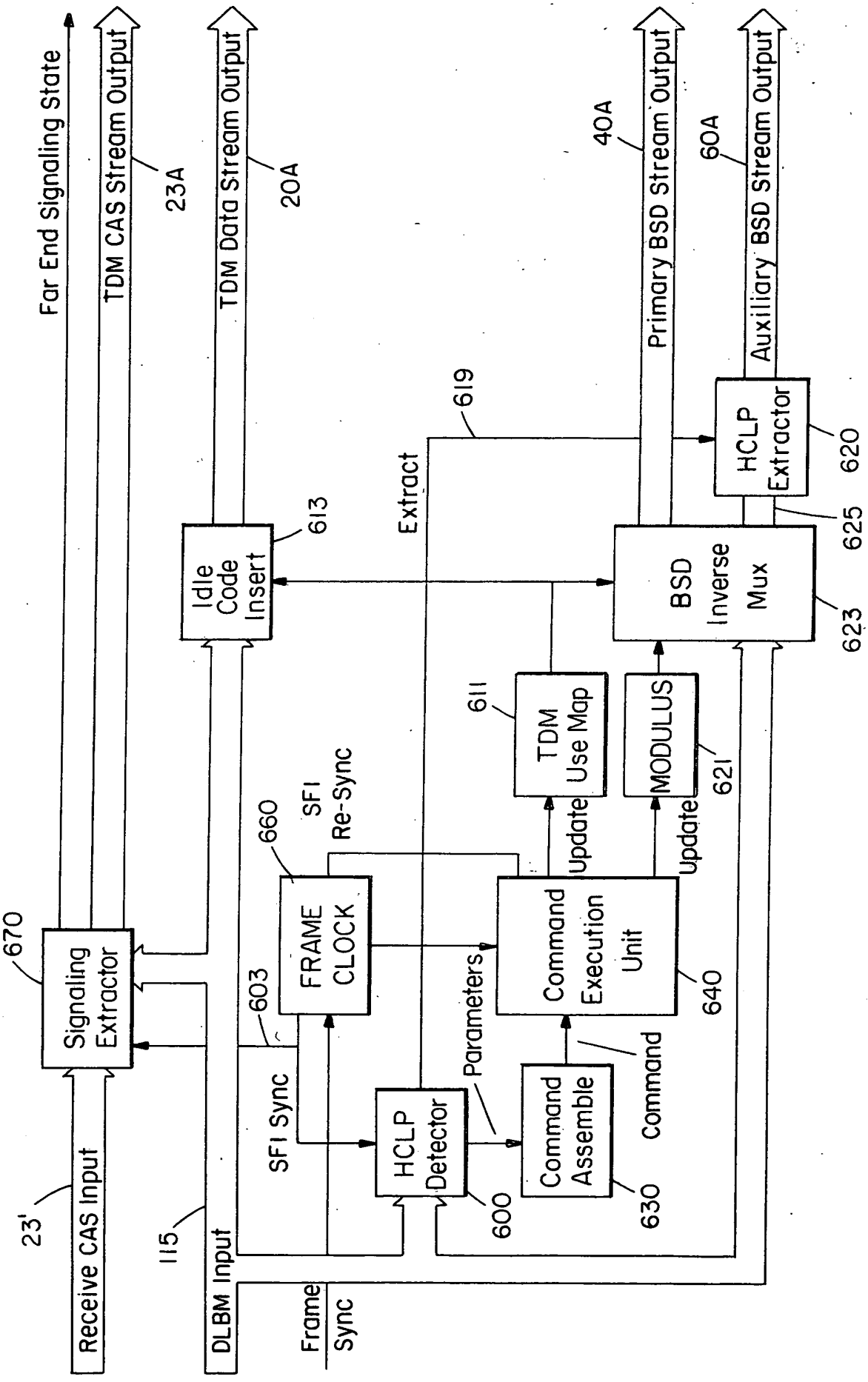
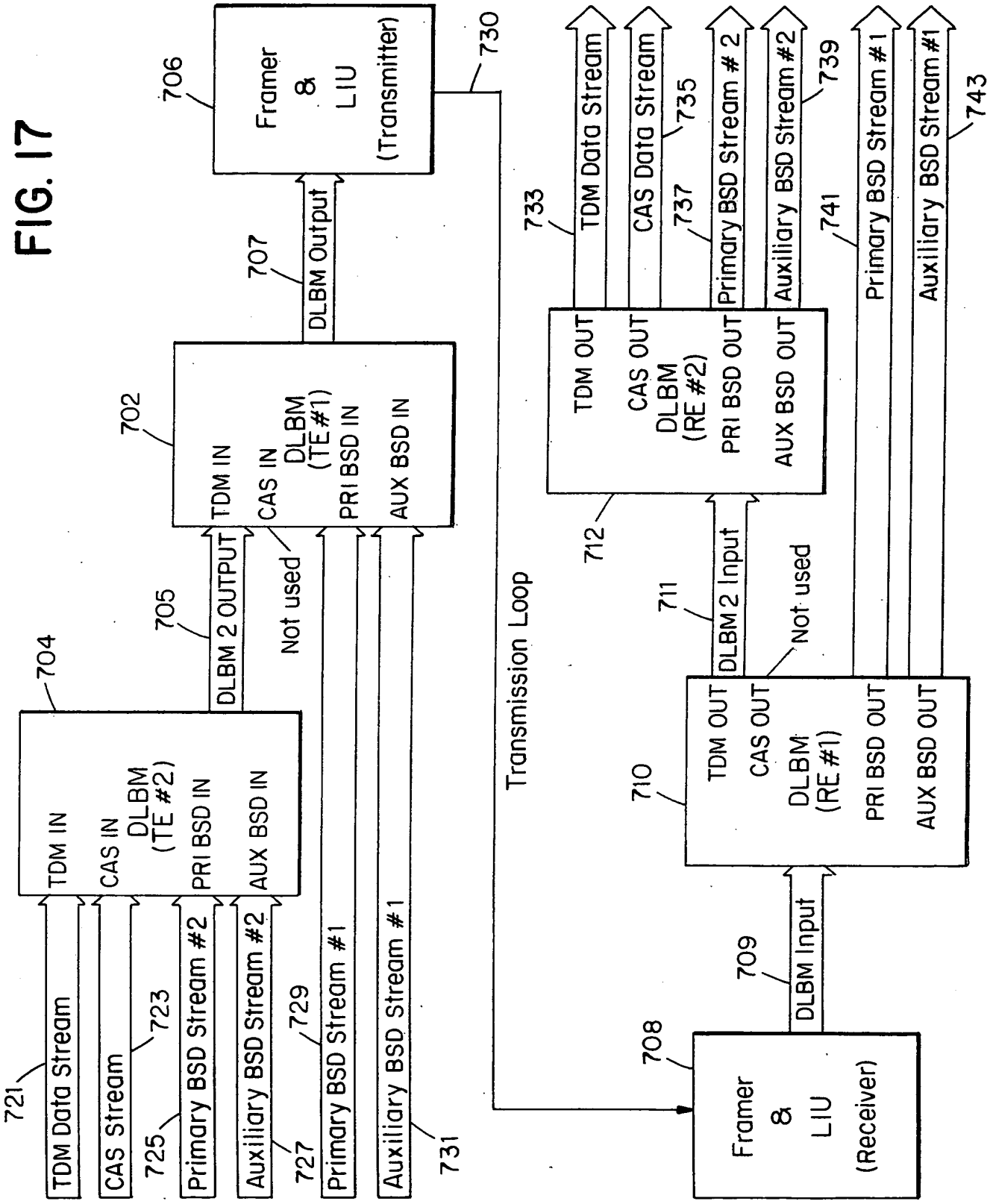

Far End Signaling State
TDM CAS Stream Output
23A
TDM Data Stream Output
20A
40A
Primary BSD Stream Output
60A
Auxiliary BSD Stream Output
619
Extract
HCLP Extractor
620
625
613
Idle Code Insert
BSD Inverse Mux
623
611
TDM Use Map
MODULUS
621
660
SFI Re-Sync
Update
Update
670
Signaling Extractor
603
FRAME CLOCK
Command Execution Unit
640
Parameters
SFI Sync
HCLP Detector
Command Assemble
Command
630
600
23'
Receive CAS Input
115
DLBM Input
Frame Sync

FIG. 16

FIG. 17


706
Framer & LIU (Transmitter)
730
707
DLBM Output
702
TDM IN
CAS IN
DLBM (TE #1)
PRI BSD IN
AUX BSD IN
705
DLBM 2 OUTPUT
Not used
704
TDM IN
CAS IN
DLBM (TE #2)
PRI BSD IN
AUX BSD IN
721
TDM Data Stream
CAS Stream
723
725
Primary BSD Stream #2
Auxiliary BSD Stream #2
727
729
Primary BSD Stream #1
Auxiliary BSD Stream #1
731
Transmission Loop
733
TDM Data Stream
CAS Data Stream
735
737
Primary BSD Stream # 2
Auxiliary BSD Stream #2
739
741
Primary BSD Stream #1
Auxiliary BSD Stream #1
743
712
TDM OUT
CAS OUT
DLBM (RE #2)
PRI BSD OUT
AUX BSD OUT
711
DLBM 2 Input
Not used
710
TDM OUT
CAS OUT
DLBM (RE #1)
PRI BSD OUT
AUX BSD OUT
709
DLBM Input
708
Framer & LIU (Receiver)